

Work Order ID 109959***109959***

Page 1

December-09-13 2:23:26 PM

Item ID: D412-596-203

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: 39" Aft Crosstube

Start Date: 12/09/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 12/10/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: W Date: _____ Tooling: _____ Date: _____Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D412-596-203	B

100

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD412-596-203 CHG001

110

0.00

110

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-596-203 using CNC bender program _____ and

Folio FT _____

****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****

127

QC15- Crosstube Dimensional Check

0.00

127

QC

Memo

0.00

Quality Control

MARK CUT LINES

Work Order ID 109959

109959

Page 2

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--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

128

0.00

128

Crosstubes

Crosstubes

Memo

0.00

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 35.87 BY QC 15 LEVEL INSPECTOR

VERF TWIST 0.950 BY QC15 LEVEL INSPECTOR

130

0.00

130

Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1- Drill Tube as per Dwg D412-596-203 Using DT _____ Drill Jigs, N/A
Set-up drill table as per QSI 010

2-Deburr

3- Engrave Part # and Batch # as per Dwg D412-596-203

4-Remove all marks from tube within limits of D412-596-203 DWG.

Tu 13-12-20



13-12-20

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140

QC6- Inspect dimensions to drawing

0.00

5/31/20

140

QC

Memo

0.00

Quality Control

172

0.00

172

Crosstubes

Memo

0.00

Crosstubes

LOAD TEST TO 3000LB FOR 1 MINUTE

N/A 9/13/20

174

0.00

174

Outsource2

Outsource process - NDT per QSI038 4.1

Memo

0.00

Outsource process - NDT

ISSUE P/O TO ACCUREN:

N/A 9/13/20

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Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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176

Receive & Inspect for Damage & Mat'l Certs

0.00

176

Packaging

Memo

0.00

Packaging

N/A CP 12/12/20

178

QC5- Inspect part completeness to step on W/O

0.00

178

QC

Memo

0.00

Quality Control

N/A CP 12/12/20

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Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180

0.00

180

SprayPaint

Spray Painting

SprayPaint

Memo

1-Prime inside & outside crosstube as per QSI 005 4.2

BATCH: _____

2- MASK UNDERSIDE OF CROSSTUBE AS SHOWN ON DWG BEFORE PAINTING

3 -Paint Outside of Tube as per Part QSI 005 4.2

BATCH: _____

4- After painting remove masking and apply matte clear coat per QSI005 4.2

NIA
TEST ONLY
P 13/12/20

190

0.00

190

QC

Quality Control

QC 14- Inspect Spray Paint

Memo

0.00

NIA
P 13/12/20

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Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	Crosstubes	0.00				1	0	0	AS
200		0.00							13-12-20
Crosstubes	Memo								
Crosstubes	1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 12. A/R scoth-weld DP460 BATCH #: <u>126328</u> <u>exp 7/14</u>								
	2- Install clamp with rubber cushion as per DWG. note 13								
	3- Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	4- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. A/R Proseal 890 Batch: _____								
	5- Install supports clamps using DT _____ as per Dwg D412-596-203, Torque clamps on support to 80-100 IN-LBS. Torque clamps on chafing shield to 40-50 IN-LBS.								
	START CURE TIME: <u>3:45</u> FINISH CURE TIME: <u>3:45</u>								
	PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.								

NO CHAFFING SHIELDS CP 13/12/20

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

210

QC5- Inspect part completeness to step on W/O

0.00

210

QC

0.00

Quality Control

Memo

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER
CURED FOR 24H.

220

Pick Kit

0.00

220

Packaging

0.00

Packaging

Memo

No pick kit 9/13/12/20

230

QC4- 100% Inspect kits for completeness

0.00

230

QC

0.00

Quality Control

Memo

No pick kit 9/13/12/20

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Run Start *NR1*

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Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00							
240	SHIP TO EXOVA								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPPD412-596-203								
	Location: _____								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

FOR TESTING ONLY
12/13/20

RD4448A

ME
14-4-24

Picklist Print

December-09-13 2:23:25 PM

Page 1

Work Order ID: 109959**Parent Item: D412-596-203****Start Date:** 12/09/13

Required Date: 12/10/13

Parent Item Name: 39" Aft Crosstube

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A NEW ISSUE JFS 13/03/22 VERIFY BY:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D3595-063-530 Rubber Cushion		Manufactured	No				Each	178.0000		2	12	13-12-20	

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
FG	5	
82656	5	
LG050	34	
103099	8	
106512	26	
LG051	139	
101880	4	
103949	38	
63407	6	
67185	6	
70067	18	
72745	2	
75783	7	
79932	13	
82656	10	
87833	5	
90969	21	
99914	9	

Already pulled on RS4

D412-596-203TRN

Manufactured

No

Crosstube Aft Extended Turning Detail

D4909-1

Manufactured

No

Support

Manufactured

No

Chaffing Shield

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG052	1	
106427	1	

Picklist Print

December-09-13 2:23:25 PM

Page 2

Work Order ID: 109959

Parent Item: D412-596-203

Parent Item Name: 39" Aft Crosstube

Start Date: 12/09/13

Required Date: 12/10/13

Start Qty: 1.00

Required Qty: 1.00

MS21920-26

Purchased

No

Each 124.0000

4

Clamp

Location

Loc Qty

Loc Code

LG050

124

102290

1

106119

16

107545

38

107974

21

109206

48

MS21920-28

Purchased

No

Each 120.0000

2

Clamp

Location

Loc Qty

Loc Code

FG

5

105884

5

LG050

104

123674

10

124505

4

125351

8

M125728

1

M126085

2

M127061

34

M127544

45

LG051

11

121440

8

123243

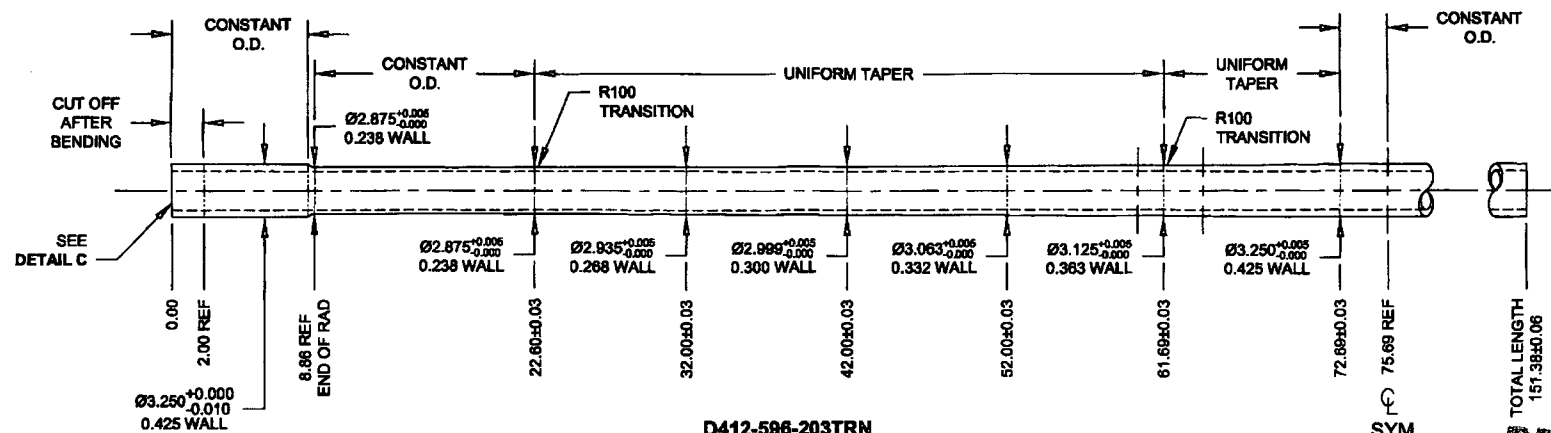
2

124260

1

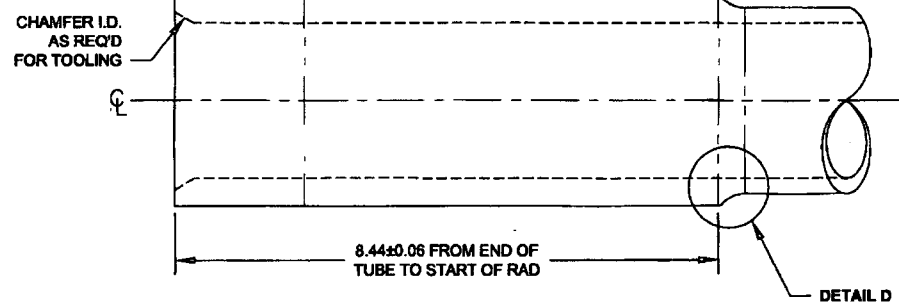
13-12-20

8 7 6 5 4 3 2 1

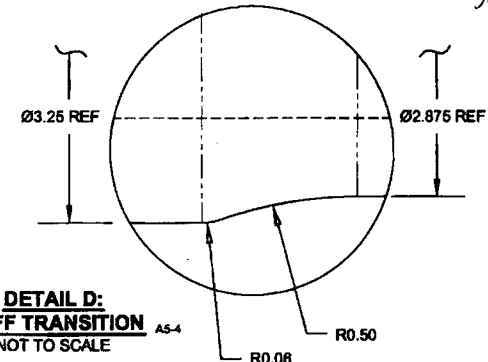


D412-586-203TRN
TURNING DETAIL







RELEASED
2013-08-06



DETAIL C:
CUFF TRANSITION C8-4
SCALE 4X



DETAIL D:
CUFF TRANSITION A5-4
NOT TO SCALE

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D412-586-203	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI HI AFT)	NTS
DATE	13.06.16	COPYRIGHT © 2013 BY DART AEROSPACE LTD	
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wlb
109959

8 7 6 5 4 3 2 1

Item	Qty -203	Part Number	Description
1	X	D412-598-203	CROSSTUBE ASSEMBLY (412 HI HI AFT)
2	1	D6020-170	CROSSTUBE MATERIAL
3	2	D3595-063-530	RUBBER CUSHION
4	1	D4909-1	SUPPORT
5	2	D4910-1	CHAFING SHIELD
7	4	MS21920-26	CLAMP
8	2	MS21920-28	CLAMP
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6020-170
FINISHED LENGTH = 151.38±0.060 (BEFORE BENDING/TRIMMING)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN B6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART P/N 'D412-598-203' AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 191.1 lb RAW MATERIAL, 118.3 lb AFTER MACHINING
116.0 lb FINISHED WEIGHT
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

BENDING

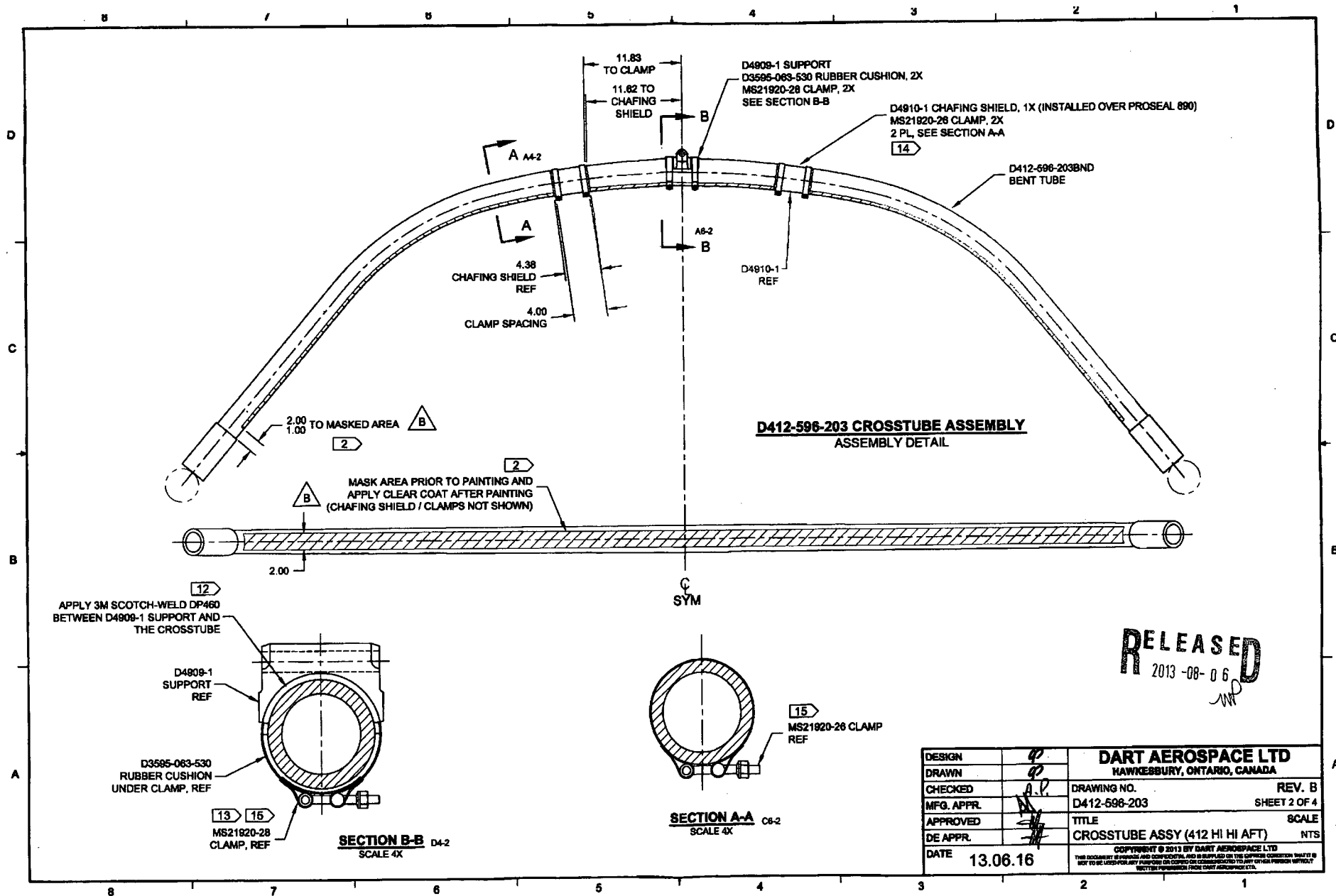
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

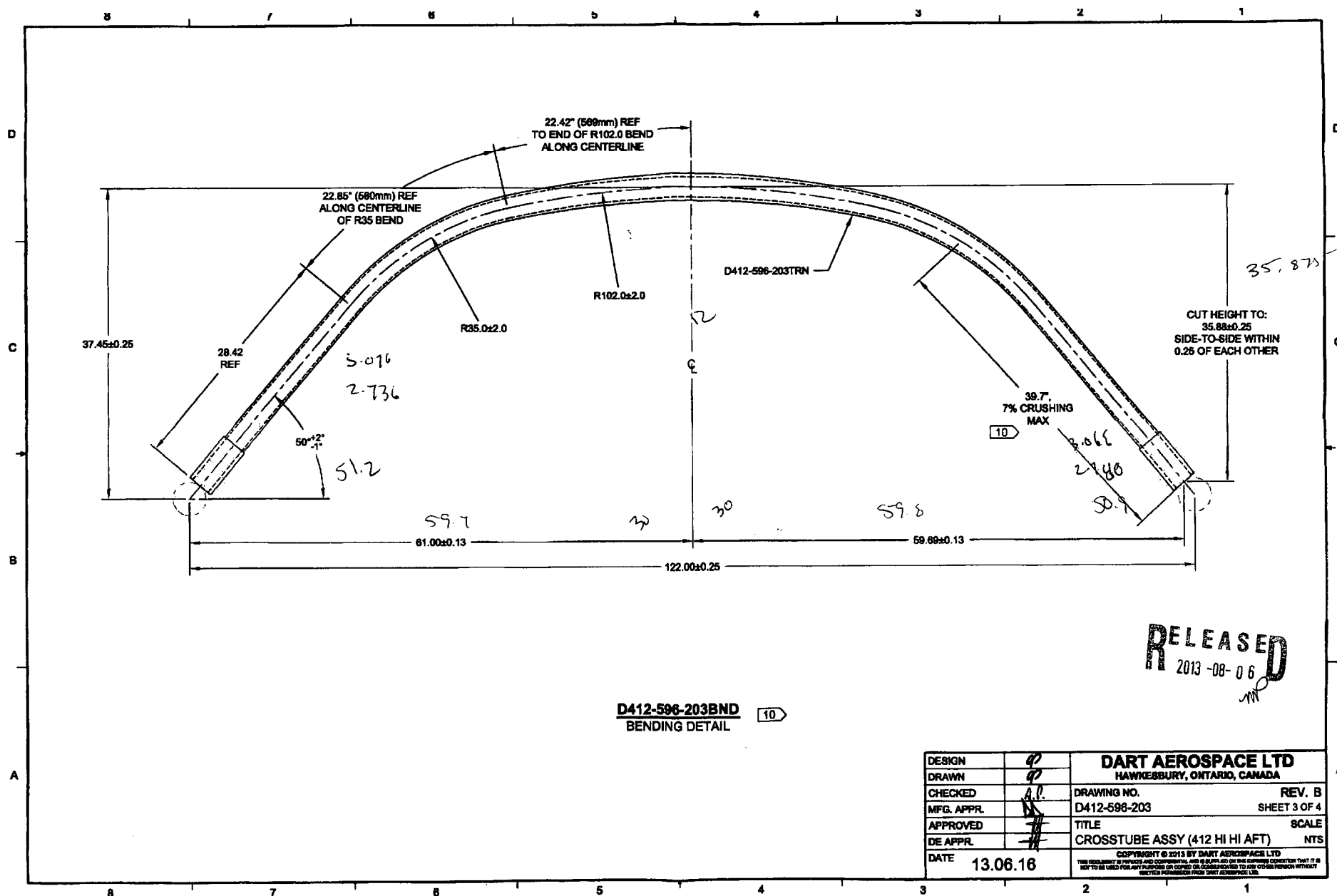
ASSEMBLY

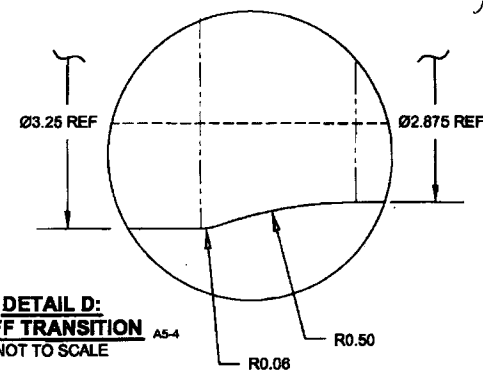
- 12) INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 13) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 15) TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

RELEASED
2013-08-06
mp

B	ADD INSPECTION WINDOW (ZN C9-1, B6-2)	CP	13.08.16
A	NEW ISSUE	CP	13.03.13
REV.	DESCRIPTION	BY	DATE
DESIGN	97	DART AEROSPACE LTD	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED	AP	DRAWING NO.	REV. B
MFG. APPR.	11	D412-598-203	SHEET 1 OF 4
APPROVED	11	TITLE	SCALE
DE APPR.	11	CROSSTUBE ASSY (412 HI HI AFT)	NTS
DATE	13.06.16	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE UNDERSTANDING THAT IT IS NOT TO BE REPRODUCED OR COPIED OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	







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CHECKED	<i>g</i>	DRAWING NO.	REV. B
MFG. APPR.	<i>g</i>	D412-588-203	SHEET 4 OF 4
APPROVED	<i>g</i>	TITLE	SCALE
DE APPR.	<i>g</i>	CROSSTUBE ASSY (412 HI HI AFT)	NTS
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D412-596-203

Stainless Steel Unhardened

Setup

Rollers: 3.25x3 **Without spacers**

Tangent lines: Center line
24" from center line, black
21" from center line, red

Buggy shims: 1.85" on buggy "A" on cuff

1:1 actual size drawing will be kept aside for use on further tubes.

Middle Bend

Tube begins on large table, at 24" black line, at an approach of **2740 on both rollers**.

Run programs 1,2,3, check (due to this being a prelim. tube.) Then run 4 and 5 to finish. Middle should be finished at 5. Compare middle to reference drawing, which will be placed on drill table until drawing is included on measuring board.

Side bends

Start bending from 21" red line going down taper at an approach of **3010 on both rollers**. run 1,2,3,4,5,6 check. from there on run 7-12 as needed at an approach of **3210 on both rollers** checking between each program. Programs back out automatically after each pass. On the second side, the buggy must be placed further up the taper, as it will hit the table if it is left on the cuff.

notes

13/04/03 bent preliminary tube today, side 1 was perfect, side 2 bent in too much at prog 11 by almost .400" this caused us to write program 10b to prevent over bendin in the future. side 1 had a more progressive bend due to the development, this may have caused the difference in the two widths.

13/04/26

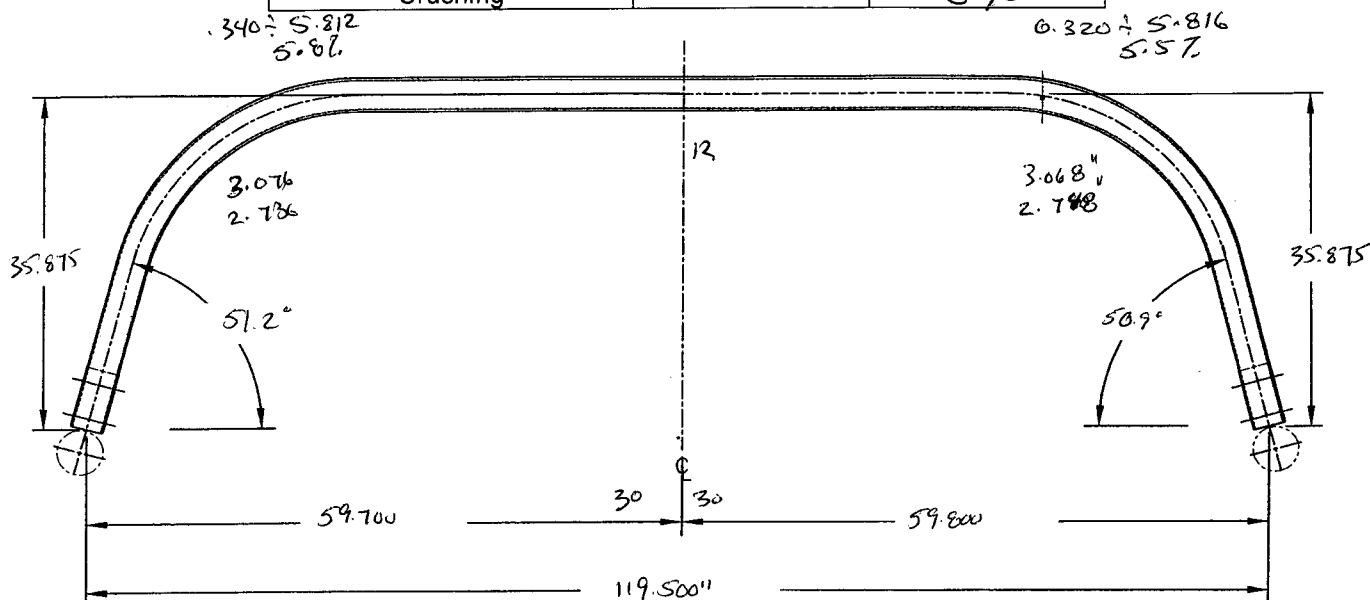
bent second prelim tube, this time hardened. the tube reacted well to the same programs, although needed additional programs in both middle and side bends to put the tube in tolerance. tube bent more quickly on the side with the heat treating holes, and finished earlier in programs.

heat treating hole side: span 59.65 finished at prog 16b
opposite side: Mid span 59.65 finished at prog 19

Side		Mid	Side	
1	9 21	1	1	9 21
2	10 D-03	2	2	10
3 (K5)	11	3	3 (K5)	11 D-03
3b	12	4	3b	12
3c	13	5	3c	13
3d	14	6	3d	14
3e	15	7	3e	15
4	16	8	4	16
5	17	9	5	17
6	18	10	6	18
7	19	11	7	19
8	20	12	8	20

DART AEROSPACE LTD	Work Order: 109959	
Description: 412 Hi Alt Crosstube Assembly	Part Number: D412-596-202	
Inspection Dwg: D412-596-203	Rev: B	Page 1 of 1

Required Dimension	Min	Max
Height	35.68	36.08
1/2 Span	59.56	59.82
Angle	49°	52°
Total Span	119.12	119.64
Bending Passes	8	
Crushing		6%



	Side A	Middle	Side B
Bending Passes	30	12	30
Crushing	5.8%		5.5%
Comments			
Side A = 5.8% crushing @ 30 passes			
Middle = 12 passes			
Side B = 5.5% crushing @ 30 passes			

DAS
12
9-88

13/12/19

QC15 Inspection	S
Date	13/12/19

Rev	Date	Change	Revised by	Approved
A		New Issue		
B	06.09.19	Reformat; QC level revised	KJ/JM	
C	07.02.06	Reformat	KJ/JM	
D	12.02.15	Added bending passes and crushing	KJ	
E	12.03.07	Revised comments table	KJ	